

PATENT
S/N 10/665,100

Docket No.: 1232-5157

AMENDMENTS TO THE CLAIMS

Claims 24-37 are pending in this application. Please cancel claims 25, 29, 30, and 32 without prejudice or disclaimer. Please amend claims 24, 28, 31, 35 and 36 as follows. The following listing of claims will replace all prior versions and listings of claims in this application.

Listing Of Claims

1-23 (Cancelled)

24 (Currently Amended): A position finding determination method of finding determining positions of a plurality of regions on an object, said method comprising:
a detection step of detecting an image of a mark ~~on~~ in each of sample regions selected from the plurality of regions on the object to generate image data, while each of the sample regions is positioned so that the image of the mark is detected;

a processing step of processing the image data, ~~with respect to each of the sample regions, with each of~~ a plurality of signal processing methods to obtain find a position of a region of the mark with respect to each of first combinations combining each of said sample regions with any one of the signal processing methods in the image data with respect to each of the plurality of signal processing methods;

an obtaining a finding step of finding obtaining an expression for converting a designed position of the mark to the found position of the mark by using a method of least squares approximately representing the positions of the plurality of regions based on positions obtained in said processing step with respect to each of second combinations a plurality of combinations of the sample regions and the signal processing methods;

an evaluation a calculation step of calculating sum of squares of differences between the converted position and the found position over the sample regions with respect to each of

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the second combinations evaluating approximation degrees of the expressions obtained in
said obtaining step; and

a selection step of selecting the expression corresponding to one of the second
combinations which minimizes the sum of squares, so as to find the positions of the plurality
of regions on the object a combination of the sample regions and the signal processing
methods based on evaluation obtained in said evaluation step.

25 (Cancelled)

26 (Previously Presented): A method according to claim 24, wherein the plurality of signal processing methods are a plurality of template matching methods of which templates are different from each other.

27 (Previously Presented): A method according to claim 24, wherein the plurality of signal processing methods are a plurality of template matching methods of which window widths to be set on the image data are different from each other.

28 (Currently Amended): A method according to claim 24, wherein the plurality of signal processing methods calculate a plurality of extremal slope positions in the image data of which kinds of the extremal slope slopes are different from each other, respectively.

29 (Cancelled)

30 (Cancelled)

31 (Currently Amended): A position finding determination apparatus for finding determining positions of a plurality of regions on an object, said apparatus comprising:
a detection system configured to detect an image of a mark on in each of sample regions selected from the plurality of regions on the object to generate image data;

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a stage storage configured to hold the object and to position each of the sample regions for said detection system to detect the image of the mark;

a first processing unit configured to process the image data, with respect to each of the sample regions, with each of a plurality of signal processing methods to find obtain a position the mark with respect to each of first combinations combining each of said sample regions with any one of the signal processing methods in the image data with respect to each of the plurality of signal processing methods; and

a second processing unit configured to find obtain an expression for converting a designed position of the mark to the found position of the mark by using a method of least squares approximately representing the positions of the plurality of regions based on positions obtained by said first processing unit with respect to each of second combinations a plurality of combinations of the sample regions and the signal processing methods, to calculate sum of squares of differences between the converted position and the found position over the sample regions with respect to each of the second combinations evaluate approximation degrees of the expressions, and to select the expression corresponding to one of the second combinations which minimizes the sum of squares, so as to find the positions of the plurality of regions on the object a combination of the sample regions and the signal processing methods based on the evaluation.

32 (Canceled)

33 (Previously Presented): An apparatus according to claim 31, wherein the plurality of signal processing methods are template matching methods of which templates are different from each other.

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34 (Previously Presented): An apparatus according to claim 31, wherein the plurality of signal processing methods are template matching methods of which window widths to be set on the image data are different from each other.

35 (Currently Amended): An apparatus according to claim 31, wherein the plurality of signal processing methods calculate a plurality of extremal slope positions in the image data of which kinds of the extremal slope slopes are different from each other, respectively.

36 (Currently Amended): An exposure apparatus for exposing a plurality of regions on an object to a pattern, said apparatus comprising:

a position finding determination apparatus as defined in claim 31 for determining finding positions of the plurality of regions on the object; and

a projection optical system configured to project the pattern onto the object which is
positions in accordance with the position found by said position finding apparatus.

37 (Previously Presented): A method of manufacturing a device, said method comprising steps of:

exposing a plurality of regions on an object to a pattern using an exposure apparatus as defined in claim 36;

developing the exposed object; and

processing the developed object to manufacture the device.